THE

Journal of the Society of Arts,

AND OF

THE INSTITUTIONS IN UNION.

110TH SESSION.] FRIDAY, JANUARY 15, 1864. [No. 582. VOL. XII.

Announcements by the Council.

SWINEY BEQUEST.

A meeting of the judges appointed under the will of the late Dr. Swiney is hereby summoned to be held on Wednesday, the 20th of January instant (being the anniversaryof his death), when the bequest under the said will, in favour of the "author of the best published Treatise on Jurisprudence," will be adjudged. The meeting will take place at the House of the Society of Arts, at five o'clock, p.m.

(By order) P. LE NEVE FOSTER,
Secretary.

13th January, 1864.

DENTON PRIZES.—COTTAGES FOR THE LABOURING CLASSES.

One hundred and seven designs for cottages have been sent in, in competition for the two prizes of £25 each, placed in the hands of the Council by J. Bailey Denton, Esq., and offered for the most approved designs for cottages to be built singly or in pairs, at a cost not exceeding £100 each. It will be remembered that one prize was to be competed for by members of the Architectural Association, and the other to be open to general competition. The latest date fixed for the reception of the designs was the 1st inst.

ORDINARY MEETINGS.

Wednesday Evenings, at 8 o'clock.

JAN. 20.—"On the injurious effects of smoke on Building Stones and on Vegetation." By Dr. A. VOELCKER.

JAN. 27.—"On the Metric System of Weights and Measures, and its Proposed Adoption in this Country." By SAMUEL BROWN, Esq., F.I.A., F.S.S.

FEB. 3.—"On Instantaneous Engraving upon Metal." By Mons. E. VIAL (illustrated with experiments).

FEB. 10.—"On Fresco Painting, as a suitable mode of Mural Decoration." By J. BEAVINGTON ATKINSON, Esq.

CANTOR LECTURES.

Courses of Lectures on the following subjects will be delivered during the Session :—

The Operation of the Present Laws of Naval Warfare on International Commerce. By G. W. HASTINGS, Esq., Barrister-at-Law.

Fine Arts Applied to Industry. By W. BURGES, Esq.

Chemistry Applied to the Arts. By Dr. F. CRACE CALVERT, F.R.S.

The third and fourth lectures of Mr. Hastings' course will be delivered on Mondays, the 25th January and 1st February, at 8 o'clock; the subjects will be as follows :—

Contraband; its Nature and Usages.

Capture of Private Property at Sea; present State of the Law as modified by the Declaration of Paris; Arguments for and against its Continuance.

The Foreign Enlistment Act; its Operation on Commerce.

REPORTS OF THE JURIES.

The complete volume of the Reports of the Juries on the Exhibition of 1862 is now ready, and is in course of issue to subscribers.

PRIZES TO ART-WORKMEN.

The works rewarded by the Society of Arts and for which prizes have been given, have been placed, by permission of the Lords of the Committee of Council on Education, in the South Kensington Museum, and will be found in the Gallery of the Iron Museum, at the entrance to the Sheepshanks Gallery.

NOTICE TO INSTITUTIONS.

The Department of Science and Art have placed at the disposal of the Council the requisite number of copies of their Official Calendar for 1864, for distribution to the Institutions in Union, and they will accordingly be issued shortly.

The Christmas subscriptions are now due, and should be forwarded by cheque or post-office order, made payable to the Financial Officer, Samuel Thomas Davenport. All cheques and post-office orders should be crossed through Messrs. Coutts and Co.

Proceedings of Institutions.

BARNSLEY MECHANICS' INSTITUTE.—A lecture was recently delivered here by the Rev. G. Mather, of Leeds. There was an overflowing audience. The subject was, "The Intellectual Powers Unfolded and Illustrated."

LANCASHIRE AND CHESHIRE ASSOCIATION.—A meeting of teachers certificated by the Science and Art Department of the Committee of Council on Education, was held on

the 30th ult. at the Manchester Mechanics' Institution, to confer with the Council of the above Association. There were about 30 delegates present. Mr. Alderman WILKINSON, of Burnley, presided.—Dr. PANKHURST, hon. sec. to the association, stated that the objects of the conference were to consider the best means of distributing the labours of the certificated teachers at present employed, and of increasing their numbers. Also it was advisable to consider how to deal with some difficulties felt as to the mode of conducting science classes in some localities, and whether districts adopting science teaching should not contribute towards its support in addition to the money granted by government.—With reference to the first of the questions named by Dr. Pankhurst, Mr. TRAICE, of Bolton, said the chief difficulty was to get pupils. There were at present 300 certificated science teachers, well qualified, but only about 50 were already employed.—It was resolved that the council of the association be requested to prepare and publish a complete list of teachers, with their subjects and terms, and the districts within which each teacher is willing to be engaged. A resolution was also passed to the effect, that the department of Science and Art be requested to rescind the clause which prohibits elementary teachers, who have pupil teachers under their charge, from acting as teachers of science classes, by refusing to admit them to payment on results, as it was felt that the rescinding of the clause, and the establishment of itinerant teachers, would be likely materially to assist smaller institutions and evening classes.

MARLBOROUGH READING AND MUTUAL IMPROVEMENT SOCIETY.—A lecture was recently given by Dr. J. C. Daniel, on "Napoleon's Campaign in Russia."

MIDDLESBOROUGH MECHANICS' INSTITUTE.—The annual social reading on behalf of this Institute took place at the Odd Fellows' Hall, on Monday evening, the 4th instant. Isaac Wilson, Esq., occupying the chair. Mr. N. Dawes gave an original essay on "The Iron Horse" (the steam engine). Mr. Wm. Taylor gave a comic reading, "How Ben Brust spent his Sovereign," and "The Death of Little Nell" (from Dicken's "Old Curiosity Shop"), was read by the Mayor. An amusing recitation, "The Ambitious Amateur Actor," was given by Mr. Adams. A reading, "The Gridiron," or "Paddy Malony's Travels in France," was given by Mr. G. F. Boddington. Several songs were also sung, and the evening was brought to a close by the company singing "God save the Queen," and returning a vote of thanks to the performers.

NEWPORT ATHENÆUM AND MECHANICS' INSTITUTE.—The directors have issued the first number of a journal, to be continued monthly. They have been encouraged to this step by the success which has attended similar enterprises in connexion with Mechanics' Institutes in various part of the country. The journal contains questions in various historical and other subjects, to which answers are invited, and particulars of entertainments and lectures are given. The only class in connexion with the Institution is the elocution and discussion class, which was instituted in October, 1862. It assembles on Monday evenings, and the exercises are varied, viz., speeches (prepared and extempore), essays, readings, recitations, and discussions. The several exercises are open to the criticism of the class. The directors, desirous of affording to the class that encouragement which it deserves, resolved at a recent meeting to give the sum of £1 as a prize for the best essay, to be written by a member of the class, on "Self-Education." Other prizes will be given for the essays which, in the opinion of the adjudicators, shall rank second and third. Sir Thos. Phillips, the Rev. S. Fox, and Mr. W. Christophers, have been named as adjudicators.

OLDHAM LYCEUM.—On the 19th Dec. the annual tea-party in connexion with the Lyceum was held in the class-rooms of the Institution, and was attended by about 350 persons. After tea, a meeting was held in the Town-hall, for the purpose of distributing the prizes to the successful candidates in the recent examinations. The chair was occupied by the Rev. R. M. DAVIES. The chairman said he could sincerely congratulate them, looking at the history of the past year. The library had received very considerable additions. With regard to the classes, at no time were they more healthy than now. In the female department, the report by the female examiners was most creditable to the teachers and pupils. The free-hand drawing-class, under Mr. Potter, was admirably conducted. In relation to mechanical drawing, Mr. Taylor, the teacher, kept up a goodly class, and the directors were anxious to make that department as successful as possible. The French class was not numerously but well attended. The Latin class was small, but regularly instructed. The certificates and prizes granted by the Society of Arts, and also those awarded at the local examinations, were then distributed. The meeting was addressed by JAMES PLATT, Esq., and other gentlemen.

SCIENCE AND ART DEPARTMENT.—RESULTS OF THE EXAMINATION FOR TEACHERS' CERTIFICATES, NOV. 1863.

The following list will be found useful to Institutions requiring science teachers:—

GROUP I.—PRACTICAL, PLANE, AND DESCRIPTIVE GEOMETRY, MECHANICAL AND MACHINE DRAWING, AND BUILDING CONSTRUCTION.

SUBJECT 1. PRACTICAL, PLANE, AND DESCRIPTIVE GEOMETRY.—1st Grade Certificate: Charles F. Dorrell, 2, Chandos-street, Covent-garden, London; Arthur J. Mayne, 39, Upper Wellington-street, Dublin; James Mellor, Science School, Oldham; John Kennedy, School of Art, Dundee; Charles H. Rule, Training College, Cheltenham; Joseph Willcock, 24, Market-place, Manchester. 2nd Grade Certificate: William Burns, Dr. Burns's School, Rochester; Henry B. Dorrell, Wellington-road, Slough; Edmund C. Plant, Normal College, Cheltenham; John Sargeant, Church-street, Slough; James Stevenson, Clark-street School, Kilmarnock; William Stone, Ralliff-street, Wolverton. 3rd Grade Certificate: Washington Hudson, Mechanics' Institution, Stockport. Eight failed.

SUBJECT 2. MECHANICAL AND MACHINE DRAWING.—1st Grade Certificate: Washington Hudson, Mechanics' Institution, Stockport; Daniel Pidgeon, Banbury; Joseph Willcock, 24, Market-place, Manchester. 3rd Grade Certificate: James M'Rae, Kirton-holm, Kilmarnock; James Mellor, Science School, Oldham; Fred. H. C. Sammons, 11, Devonshire-road, Liverpool; Samuel Taylor, 5, Havelock-terrace, Brook's bar, Manchester. Four failed.

SUBJECT 3. BUILDING CONSTRUCTION.—1st Grade Certificate: Gilbert R. Redgrave, 18, Hyde-park-gate South, Kensington, London; Frank D. Wakeford, 12, Ann's-terrace, Walham-green, London. 2nd Grade Certificate: James Mellor, Science School, Oldham; Samuel Taylor, 5, Havelock-terrace, Brook's-bar, Manchester; Joseph Willcock, 24, Market-place, Manchester. 3rd Grade Certificate: Henry B. Dorrell, Wellington-road, Slough; Washington Hudson, Mechanics' Institution, Stockport; John Sargeant, Church-street, Slough. One failed.

GROUP II.—MECHANICAL PHYSICS.

SUBJECT 1. THEORETICAL MECHANICS.—1st Grade Certificate: Edward H. Birkenhead, Mining School, Wigan; George Gates, St. Mark's College, Chelsea, London. 2nd Grade Certificate: Richard Jones, St. Mark's College, Chelsea, London; Robert Stroud, ditto; John E. Whitehead, ditto. 3rd Grade Certificate: John Bryant, St. Mark's College, Chelsea, London; Edwin Hurst, ditto. One failed.

SUBJECT 2. APPLIED MECHANICS.—2nd Grade Certificate: Richard Strachan, Sailors' Home, Poplar, London. 3rd Grade Certificate: James M'Rae, Kirton-holm, Kilmarnock; James D. Thomas, 3, Colleton-buildings, Exeter. Two failed.

GROUP III.—EXPERIMENTAL PHYSICS.

SUBJECT 1. ACOUSTICS, LIGHT, AND HEAT.—1st Grade Certificate: Joshua J. Doherty, Model National School, Belfast; William Gunn, National School, Newtown, Montgomeryshire; George J. Snelus, Christ Church School, Macclesfield; Charles J. Woodward, Midland Institute, Birmingham. 2nd Grade Certificate: John Angel, Mechanics' Institution, Manchester; Edward Bowen, Science School, Liverpool; John Collins, Cathedral School, Manchester; William H. Greer, National Model School, Newtownards; James J. Kelly, Parish School, Gladsmuir, East Lothian; Henry A. Reatchlous, Training College, Westminster, London; James H. Webster, ditto; Edmond Wren, Model School, Ballymena. 3rd Grade Certificate: John Beatty, Endowed School, Oldcastle, County Meath, Ireland; William Cooper, National School, Tintwistle, Manchester; John S. Holden, Holywood, Belfast; Evan H. Rowland, National School, Llanferres, Mold. Three failed.

SUBJECT 2. MAGNETISM AND ELECTRICITY.—1st Grade Certificate: Joshua J. Doherty, National Model School, Belfast; George J. Snelus, Christchurch, Macclesfield; and Alfred P. Wire, National School, Little Baddow, Chelmsford. 2nd Grade Certificate: Thomas Beesley, 5, High-street, Banbury; Edward Bowen, Science School, Liverpool; William Burns, 8, Newton-terrace, Rochester; John Collins, Cathedral School, Manchester; Joseph Craven, Parish School, Stavelay, Chesterfield; William H. Greer, National Model School, Newtownards, Ireland; William Gunn, National School, Newton, Montgomeryshire; John S. Holden, Holywood, Belfast; Leopold C. Rückert, Union-street, Oldham; Charles J. Woodward, Midland Institute, Birmingham. 3rd Grade Certificate: John Beatty, Endowed School, Oldcastle, county Meath, Ireland; John Howard, Public School, Lower-road, Islington, London; Isaac Mackrell, Wesleyan School, Dartford; James J. Kelly, Parish School, Gladsmuir, East Lothian; Edmond Wren, Model School, Ballymena, Ireland. One failed.

GROUP IV.—CHEMISTRY.

SUBJECT 1. INORGANIC CHEMISTRY.—1st Grade Certificate: Alfred H. Allen, 14, Fernley-place, Glossop-road, Sheffield; John Angell, Mechanics' Institution, Manchester; Richard Bannister, 7, Coulston-street, Chelsea, London; Charles Estcourt, 28, Halsey-street, Chelsea, London; Joseph Hartley, 39, Bridgewater-street, Manchester; John S. Holden, Holywood, Belfast; John Robertson, Bagshot, Surrey; William T. Rowden, 119, Stanhope-street, London; and John Scott, Grammar School, Loughborough. 2nd Grade Certificate: Jonathan G. Hands, St. Paul's School, Wilton-place, Eaton-square, London; John Howard, Public School, Lower-road, Islington, London; William Judd, Christchurch, Hants; Edward H. M'Millan, National School, Campden, Gloucester; William Rigg, People's College, Nottingham; Andrew Smyth, Endowed School, Oldcastle, county Meath, Ireland; and Richard Trower, Industrial School, Brighton. 3rd Grade Certificate: James J. Kelly, Gladsmuir Parish School, East Lothian, Scotland; and John James Spear, Woodbine-cottage, Newton Vivey-road, Bray, Ireland. One failed.

SUBJECT 2. ORGANIC CHEMISTRY.—1st Grade Certificate: Alfred H. Allen, 14, Fernley-place, Glossop-road, Sheffield; Richard Bannister, 7, Coulson-street, Chelsea, London; and Charles Estcourt, 28, Halsey-street, Chelsea, London. 2nd Grade Certificate: Joseph Hartley, 39, Bridgewater-street. Manchester; John S. Holden, Holywood, Belfast; and Andrew Smyth, Endowed School, Oldcastle, County Meath, Ireland. One failed.

GROUP V.—GEOLOGY AND MINERALOGY.

SUBJECT 1. GEOLOGY.—1st Grade Certificate: Robert Beveridge, 1, Gallowgate, Aberdeen; James Dowling, Model School, Waterford; and Wm. L. Notcutt, 399, High-street, Cheltenham. 3rd Grade Certificate: Alfred Henry Allen, 14, Fernley-place, Sheffield; George C. T. Bartley, Kensington, London; William Prosser, Dean-row British School, Wilmslow, Cheshire; and James Saunders, Alma-street, Luton, Beds. Nine failed.

SUBJECT 2. MINERALOGY.—2nd Grade Certificate: Alfred H. Allen, 14, Fernley-place, Sheffield. One failed.

GROUP VI.—ANIMAL PHYSIOLOGY AND ZOOLOGY.

SUBJECT 1. ANIMAL PHYSIOLOGY.—1st Grade Certificate: George C. T. Bartley, Kensington, London; Uriah J. Davis, Upton St. Leonards, Gloucester; Alfred Jones, Cross-street Day School, Islington, London; William L. Notcutt, High-street, Cheltenham; Moses Pullen, Free School, Painswick, near Stroud; and Thomas Viccars, British School, Torquay. 2nd Grade Certificate: Richard Bithel, British School, Kingsland, London; Thomas Cribbin, Birkbeck School, Peckham, London; Ellis A. Davidson, School of Art, Chester; Tycho E. Hotchkin, Somerby, near Oakham; and Henry A. Reatchlous, Training College, Westminster, London. 3rd Grade Certificate: Thomas Edwards, Victoria-street, Govan-by-Glasgow; Benjamin Foster, Training College, Westminster, London; Wm. Prosser, Dean-row School, near Wilmslow, Cheshire; and James H. Webster, Training School, Westminster, London. Four failed,

SUBJECT 2. ZOOLOGY.—1st Grade Certificate: Alfred Jones, Cross-street School, Islington, London; and Wm. L. Notcutt, 399, High-street, Cheltenham. 2nd Grade Certificate: Richard Bithel, British School, Kingsland, London; Alexander W. A. Finlay, 52, India-place, Edinburgh; and Mrs. Elizabeth Mayer, Secular School, Glasgow. 3rd Grade Certificate: Ellis A. Davidson, School of Art, Chester. Two failed.

GROUP VII.—VEGETABLE PHYSIOLOGY, ECONOMIC AND SYSTEMATIC BOTANY.

SUBJECT 1.—VEGETABLE PHYSIOLOGY AND ECONOMIC BOTANY.—1st Grade Certificate: John Collins, Cathedral Schools, Manchester; Uriah J. Davis, Upton St. Leonards, Gloucester; Thomas Jones, Halton, Hastings; Margaret Macornish, Corsock, near Dalbeattie, N.B.; William L. Notcutt, 399, High-street, Cheltenham. 2nd Grade Certificate: John S. Holden, Holywood, Belfast; William Judd, High-street, Christ Church, Hants; Frederick J. A. Leipner, 22, Upper Park street, Clifton; Moses Pullen, Free School, Painswick, near Stroud. 3rd Grade Certificate: Thomas H. Cook. Horsham-road, Dorking; Alexander W. A. Finlay, 52, India-place, Edinburgh; Elizabeth S. L. Jones, Halton, Hastings. Three failed.

SUBJECT 2. SYSTEMATIC BOTANY.—1st Grade Certificate: John S. Holden, Holywood, Belfast; William L. Notcutt, 399, High-street, Cheltenham. 2nd Grade Certificate: John Gibbs, Baddow-road, Chelmsford. 3rd Grade Certificate: William Judd, High-street, Christ Church, Hants; Frederick J. A. Leipner, 22, Upper Park-street, Bristol. One failed.

GROUP VIII.—MINING AND METALLURGY.

SUBJECT 1. MINING.—1st Grade Certificate: Mark Fryer, Andersonion University, Glasgow. 3rd Grade Certificate: Robert Muir, Auchinheath, N.B.

SUBJECT 2. METALLURGY.—2nd Grade Certificate: John Angell, Mechanics' Institution, Manchester; Henry P. Meaden, East Lancashire Union of Institutes, Haslingden. 3rd Grade Certificate: George J. Snelus, Christ Church, Macclesfield.

NAVIGATION.

SUBJECT 1. MATHEMATICS.—1st Grade Certificate: Samuel Crawley, Proprietary School, Hereford; Arthur J. Gayne, Trade School, Bristol. One failed.

SUBJECT 2. GENERAL NAVIGATION.—1st Grade Certificate: Arthur J. Gayne, Trade School, Bristol. 2nd Grade Certificate: Samuel Crawley, Proprietary School, Hereford.

SUBJECT 3. NAUTICAL ASTRONOMY.—1st Grade Certificate: Arthur J. Gayne, Trade School, Bristol.

SUBJECT 4. PHYSICAL GEOGRAPHY.—2nd Grade Certificate: Arthur J. Gayne, Trade School, Bristol. 3rd Grade Certificate: Samuel Crawley, Proprietary School, Hereford. One failed.

SUBJECT 5. STEAM.—2nd Grade Certificate: Harry Evers, Charles' National School, Plymouth; John Merrifield, Navigation School, Plymouth; Richard Strachan, Navigation School, Poplar. 3rd Class: J. M'Rae, Kirtonholm, Kilmarnock.

PRELIMINARY HIGHER MATHEMATICS.—3rd Grade Certificate: Samuel Crawley, Proprietary School, Hereford.

BUILDING STONES.

The following memorandum of the results of examination into the comparative qualities and fitness for building purposes of samples of stone from different quarries in the Island of Portland, was drawn up for the Inspector General of Fortifications, by F. A. Abel, F.R.S., Chemist of the War Department, and contains information likely to be useful to all interested in building:—

A collection of twenty-eight specimens, representing the stone obtained from different quarries and beds on the Island of Portland, has been submitted:—1. To a careful comparative inspection. 2. To experiments, having for their object the attainment of comparative data, regarding (*a*) the chemical composition of the stones; (*b*) their strength and power of resisting wear from mechanical causes; (*c*) their porosity, or absorbent power, and consequent susceptibility to the destructive effects, mechanical and chemical, of atmospheric agents. As regards chemical composition, the differences, indicated by the analysis of the specimens of stone from different quarries, are only of a trifling description, and not calculated to influence in any definite manner the comparative durability of the different varieties of stone. The properties which it is considered should, apart from the questions of chemical composition and facility of working in the mason's hands, be combined in a building-stone, capable of resisting effectually the fullest exposure to atmospheric influences, are, (1) compactness of structure or a low degree of porosity; (2) strength and hardness (to the greatest extent compatible with the working of the stone); (3) uniformity of structure.

The results of the experiments show that all the superior descriptions of "Whit-bed" stone combine strength and compactness in a considerably higher degree than the varieties of "Base-bed" stone. Some kinds of the "Whit-bed" stone, however (*i.e.*, those from the New Maggot and Inmosthay Quarries), though ranking with the best as regards strength, exhibit a greater degree of porosity. Again, other "Whit-bed" stones (from Old Maggot, Waycroft, and Independent Quarries) exhibit but little superiority, in point either of strength or compactness, over the generality of the "Base-bed" stones;

TABLE SHOWING THE COMPARATIVE ORDERS OF STRENGTH AND COMPACTNESS OF SAMPLES OF STONE FROM DIFFERENT QUARRIES IN THE ISLAND OF PORTLAND.

Description of Stone.	Order of Compactness.	Order of Strength.	Peculiar Features of each Stone.
ROACH.			
War Department, Vern Hill Quarry	One.*	One.	Light coloured, very hard and compact, one of the heaviest stones of the series; its weight being very much greater than that of the Roach from Independent Quarry. Its strength is not uniform, as it contains numerous shells and cavities.
ROUGH WHIT-BED.			
Admiralty Quarry, Quarried recently	Two.*	Two.	Rough, but compact; contains numerous small shells.
" " Do. last autumn.	Two.*	One.	Containing only few cavities.
" " Do. 3 years ago	Between six and seven.	Between four & five.	Very rough and irregular, containing large shells; differing, therefore, greatly from the other samples from Admiralty Quarry.
War Department Quarry, Vern Hill (Bed not specified, evidently WHIT-BED), Quarried recently	Three.	One.	Hard and very compact; containing, however, some large cavities.
Do. last autumn	Four.	Three.	A very hard light-coloured stone, containing numerous pin-hole cavities.
Do. 3 years ago	Four.	Three.	Similar to No. 1 from this quarry, though somewhat less compact, apparently free from cavities.
WHIT-BED.			
Admiralty Quarry, Quarried recently	Four.	Three.	All these samples very similar. Light-coloured compact stones, containing a few small shells. Apparently free from cavities.
" " Do. last autumn	Four.	Three.	
" " Do. 3 years ago	Four.	Two.	
Inmosthay Quarry	Six.	One.	Fine grain, moderately compact, almost destitute of shells; one of the most uniform of the Whit-bed series.
New Maggot Quarry	Five.	Two.	Light coloured, compact, and very uniform.
BASE-BED.			
Admiralty Quarry, Quarried recently	Four.	Three.	Nos. 1 and 3 are similar: light-coloured, compact, and very uniform. No. 2 is somewhat darker, and exhibits patches of closer texture. They exhibit more indications of shells than any other Base-bed stones; and are, in appearance and properties, very similar indeed to Whit-bed stone.
" " Do. last autumn		Two.	
" " Do. 3 years ago		Two.	
WHIT-BED.			
Old Maggot Quarry, Marked I T	Between six and seven.	Four.	Nos. 1 and 3 are much rougher in texture than No. 2, which is a little superior to them in compactness, but is somewhat less uniform.
" " " L I	Six.	Three.	
" " " I E	Between six and seven.	Four.	
Waycroft Quarry	Seven.	Four.	Rough in texture and porous.
Independent Quarry	Between seven & eight.	Four.	Fine grained but porous.
BASE-BED.			
Old Maggot Quarry, Marked I T	Seven.	Three.	I T is uniform, but I E exhibits faint bands of stratification. L I is about the lowest quality of Base-bed stone examined. It is very soft and porous.
" " " I E	Seven.	Five.	
" " " L I	Ten.	Six.	
Waycroft Quarry	Eight.	Four.	Light-coloured and uniform.
Inmosthay Quarry	Eight.	Four.	Exhibits considerable want of uniformity.
New Maggot Quarry	Nine.	Three.	Very uniform; similar to I T Old Maggot Quarry, though more porous.
Independent Quarry	Nine.	Six.	A rough very porous stone, exhibiting considerable difference of strength in different portions; to be ascribed to the fossil markings observed here and there.
ROACH.			
Independent Quarry	...	...	A very inferior description of stone. Full of large loose petrifactions and cavities of considerable size. The strength of the most compact portion was only about half that of the weakest of the above stones.

* The compactness of these is about as high again as those next in order,

and are, indeed, inferior to the best "Base-bed" variety. The "Base-bed" stones are, undoubtedly, more generally uniform in structure than those of the "Whit-bed;" this being mainly due to the comparative freedom of the former from distinct petrifactions. Though such petrifactions were shown, by the results of experiments, to impart, in many instances, great additional strength to the stone, they frequently give rise, by their existence, to cavities, sometimes of considerable size, which not only serve to weaken those particular portions of the stone, but may also, if they exist in proximity to exposed surfaces of a block of stone, promote its partial disintegration by the action of frost. Greater care is therefore unquestionably required in the selection of "Whit-bed" stone than need be employed in the case of all the better varieties of "Base-bed" stone.

Appended to this Memorandum, in a tabular form, is a statement of the comparative strength and compactness of the different varieties of stone, as represented by the specimens experimented upon, together with a description of the peculiarities noted on examination of the specimens, many of which have an important bearing npon the results obtained in the experiments instituted with the blocks.*

The results of these experiments lead to the following conclusions, regarding the comparative merits of the various descriptions of Portland stone in question for building purposes. The Roach stone from "War Department" Quarry is an invaluable stone for external work in localities where very considerable strength and power of resisting mechanical wear are required, *e.g.*, in connection with those portions of work which may become exposed to the continual abrasive action of water. The rough "Whit-bed" stone from Admiralty Quarry (as represented by specimens 1 and 2, see table), is also a highly valuable stone for external work, of a similar kind, where great strength is required, and particularly where the numerous irregularities in the above Roach stone may be objectionable.

The following varieties are all well calculated for external work, and Mr. Abel considers that the order of their relative value is as follows:—

1. Stone from War Department Quarry, Vern Hill; "Whit-bed" stone, Admiralty Quarry. 2. "Whit-bed" stone, New Maggot Quarry; "Base-bed" stone, Admiralty Quarry. (This may be considered quite equal in quality to Whit-bed stone.) "Whit-bed" stone, Inmosthay Quarry. (Particularly adapted from its texture and uniformity for ornamental work.) 3. Whit-bed stone, Old Maggot Quarry. (a.) Marked L I. (b.) Marked I T and I E.

For internal work, the following rank highest, on account of their uniformity and comparative strength:—"Base-bed" stone, Old Maggot I T; "Whit-bed" stone, Independent Quarry; "Base-bed" stone, Waycroft Quarry; "Base-bed" stone, New Maggot Quarry.

The following are inferior to those just named, in texture and uniformity:—"Whit-bed" stone, Waycroft Quarry; "Base-bed" stone, Old Maggot Quarry I E; "Base-bed" stone, Inmosthay Quarry.

The "Base-bed" stone from Old Maggot Quarry marked L I, and that from Independent Quarry, are of low quality, as compared with the remainder; and no reliance can be placed on the durability of the Roach stone from Independent Quarry, judging from the specimen received.

The author observes that no definite conclusion can be drawn, from the comparative properties of the specimens of stone from one and the same locality (quarried at different periods of time), regarding the influence exerted by exposure, after quarrying, upon the quality of the stone. In the instance of the examples of rough "Whit-bed" stones from Admiralty Quarry, the specimen quarried last autumn was decidedly the strongest (that quarried three years ago differed altogether in character from the other specimens). The specimens of "Whit-bed" stone from the Admiralty Quarry were very much alike in strength; there being a slight difference in favour of that quarried three years ago. In the "Base-bed" specimens, from the same quarry, the strength was also found to increase somewhat with the age of the stone; but, of the specimens from the War Department Quarry, the one most recently quarried was considerably stronger than the others. Here again, however, the difference must be ascribed to a difference in structure; the other two specimens (quarried last autumn and three years ago) were in all respects alike. On the whole, the evidence may be considered as a little in favour of the opinion that an improvement in the strength of the stone is effected, to some extent, by seasoning.

* These experiments consisted, chiefly, of careful determinations:—

1.) Of the comparative absorbent power exhibited, under precisely similar conditions, by cubes of the different stones, and

(2.) Of the weight sustained, up to the point of fracture (*i.e.*, the crushing weights), by accurately cut cubes of the stones. Three cubes of each variety of stone were crushed, and the conclusions, as to the comparative strength of the stones, were drawn from the mean results thus arrived at. These crushing experiments were carried out with the well-known American mechanical testing machine.—F. A. A.

Fine Arts.

MULREADY'S WORKS AND SKETCHES.—Messrs. Christie advertise that this sale will take place on the 18th, 19th, and 20th April. It is stated that the exhibition of all his works will be opened at the South Kensington Museum on Thursday, the 17th March.

ELECTROTYPE COPIES OF THE BRONZE GATES OF THE CATHEDRAL AT PISA are being made for the South Kensington Museum. The *Nazione* lately stated positively "that the castings of the beautiful side door of the Cathedral fronting the bell-tower, wrought in bronze by Bonanno, of Pisa, in the 12th century, have recently been spoiled through want of experience of those who have undertaken to make moulds of them in gelatine;" whereupon the responsible official addressed a letter to the editor of *La Nazione*, in answer, as follows:—"The Academy of Fine Arts in Pisa having heard the report of the commission charged to examine the operation of moulding the bronze gates of the Cathedral of Pisa, have solemnly and unanimously declared that no injury whatever has resulted to the bronzes from the operation, and that leave may be safely granted to Sig. Franchi to continue his work upon the plan hitherto pursued, which is declared perfectly harmless to these masterpieces. The undersigned, on whom alone would rest the responsibility of these fancied injuries, has much pleasure in announcing this decision, and requests an immediate insertion of his letter, in respect of the importance of the question.—CARL. GAETANO POGGESI, of the Board of Works of the Cathedral, Pisa."

Manufactures.

INDUSTRIAL ART IN FRANCE AT THE RECENT EXHIBITION IN THE PALAIS DE L'INDUSTRIE.

The following is a translation of some portions of an article in the *Revue des Deux Mondes*, by M. A. de Beaumont:—

Some years ago the superiority of France in industrial art was scarcely a subject of doubt. In this domain, where clever workmanship can only exist corrected and disciplined by a taste for the beautiful, we did not know of any rivals. Even at the Exhibition of 1855 we retained the preference for ingenious inventions and productions of an elegant

kind. And yet, in 1862, a remarkable event took place, French Industrial Art found at the Universal Exhibition of London a rival, an unexpected competitor, nearly a conqueror in British Industrial Art.

How explain this sudden triumph of our neighbours? By what secret had they in five years acquired those rare qualities of which we were so justly proud? Such is the question which those who take an interest in a closer alliance between art and industry in France did not venture to put to themselves a year ago without reasonable anxiety. At the present time this question is renewed, and it would seem that at the Exhibition which has been some time opened at the Champ Elysées, French Industrial Art itself wished, in presence of its new rival, to examine itself as to its real strength, submit to the judgment of the public its newest productions, ascertain what progress has been made in the last few years, and ask itself what remains to be accomplished? This attention to progress in the several branches of Art in which we have hitherto been considered superior, is certainly not to be denied. It testifies to a real feeling of the requirements of our period. We live in an age where positions are easily changed, and where it is necessary (and it is the same with mankind as it is with individuals) in order to secure the position already required, to increase our efforts to keep ourselves always in the right direction. Is it sufficient to know our position, to number with pride the riches we possess, to acknowledge with regret the riches we have lost? Certainly not, and France, one must own, deceives herself rather too much about exhibitions. Exhibitions repeated at short intervals cannot have any very sensible influence on art. Our neighbours proceed with less show but more logic, and here we are recalled to the question which evoked the Exhibition of 1862. That exhibition at least taught us one important fact, which is, that in barely ten years England had nearly surpassed us in applications of art to industry; but the explanation of this great advantage for England is in the part she has taken, not at the exhibitions, but in the study of art itself. These years have not been passed in admiring her own productions, they have been passed in instructing, in strengthening herself by the study of good examples; in a word, by her developing at home instruction in Industrial Art in the most liberal manner.

After the great international gathering inaugurated by the Exhibition of 1851, England felt her inferiority in that sphere of industry which specially applies to Art. A noble spirit, whose memory is justly revered, Prince Albert, pointed out the causes of that inferiority, and took the initiative of those improvements which in ten years have nearly changed the aspect of affairs. England possesses at the present moment 800 or 900 societies, whose mission it is to propagate a feeling for art and taste. These societies number 200,000 members, which in their turn encourage 100 Schools of Art and nearly 300 private industrial schools. Museums of all kinds have been created for each industry, with public instruction and special lectures for the different kinds of manufacture. To this development has been added the purchase of books, drawings, and engravings, which may serve as models and examples. This vast system carries with it a considerable amount of funds, and a body of intelligent men devoted to Art and attached firmly to these institutions by a proper remuneration. We saw in 1862, in London, several specimens of the works of these new industrial schools of Art, and we must acknowledge that if the students are not so clever as those of our schools, they arrive, thanks to the happy choice of models, at an incontestable superiority. Regarding the excellent movement of Schools of Industrial Art which England presents to us, where is France at the present time? The Exhibition of 1862 showed this to us, for there was the happy idea, which deserves to be encouraged, of bringing the schools of the whole country into that industrial competition. It is, therefore, necessary that France should know how to recognise that which England acknowledged to herself ten years ago, that her instruction in Industrial Art requires a complete reformation. The study of nature and the old masters, the only fruitful study which manifests itself in England in such important results, is scarcely found, except very feebly, in the drawings exhibited by the students in the Champs Elysées. The greater part of the drawings exhibited betray a bad method applied to the education of our young industrial artists, who are generally kept in a closed room facing a cast without interest, or before those tortured lithographs the laborious execution of which a child is kept for months studiously endeavouring to imitate. How much time is lost in producing these symmetrical hatchings, which make the pupil forget the object of the design, and even the subject which is being copied. If the students were only surrounded by the elegant and precious objects which ornament the palaces, perhaps their imaginations, awakened by the comparison of the beautiful, would not depart from the laws of taste, but this cold atmosphere of the school or class-room is not calculated to give to youth that pure and elevated taste which the grandeur of divine works of art alone can inspire.

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There is wanting a good system for our schools, and that is the reason why, for the last ten years, our industrial art has seen its ancient prestige decay. This fact established, let us pass from the method of instruction to the works it has produced, and it will be easy to show, by a few characteristic examples what the Exhibition in the Champs Elysées has revealed to us as to the tendencies and as to the efforts of national genius in a sphere in which it has been so accustomed hitherto to triumph.

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There is certainly in the designs for carpets, shawls, lace, and jewellery which cover the walls great cleverness, but artists, engravers, lithographers, carvers, niello-workers and enamellers, all imagine that by attaining in their work the greatest amount of evenness and the uniformity of a machine, they will arrive at perfection. They abandon all expression in their drawing, and consider that they have reached the mark when they have brought their hand to resemble that piece of steel in the machine for pricking and tracing, of which they make too frequent use. What time and pains is taken to bring under control the muscles, to destroy all signs of life, of spirit, in a word, inspiration of the highest art, which is only found in truly eloquent works, if we may so express ourselves, in the works where a generous feeling makes itself felt and destroys their uniformity. That great exactitude which pre-occupies the industrial artist of these days, prevents him from seizing the poetry and the philosophy of his work and consequently loving it. He is only an automaton charged to execute mechanically a drawing which is given him; there his art ceases, and he ignores entirely other processes.

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Passing from the porcelain to the glass, we notice in the first place the productions of Messrs. Dupouchet and Gosse. That which specially characterises this manufacture is the desire to imitate porcelain. Certainly glass and porcelain are very much allied; on the one hand you make opaque glasses, and on the other transparent porcelain; there is no longer any line of demarcation. Of what service would this imitation be? Does not the quality and the merit of the glass consist in its transparency? Coffee in a glass cup and wine in a porcelain vase would be out of place. All these changes of ideas, by which it is thought to introduce novelty, produce only disorder. It is not the right way—it is nonsense, as the English term it. Our manufacturers should be on their guard. The Exhibition of London has shown us by comparison how much England has advanced in the manufacture of glass. In the courts at the South Kensington Museum, you see brought together the most mavellous specimens of glass which, manufactured at Tyre, Sidon, Byzantium, Bagdad, and at Cairo, Venice, and Rhodes, show to all

how art is allied to industry. The English artizan of the City did not miss the opportunity of taking a lesson from them.

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Pottery of an artistic character in France, as in England, has shown a considerable development, which only dates within the last few years. Since porcelain has replaced earthenware in everyday life, pottery has been hardly thought of, but artists and amateurs, wearied of the want of freedom and breadth of the painting on porcelain, have again given an honourable place to those Persian, Italian, and French potteries of the middle ages, which command such fabulous prices at sales. That Henri Deux ware, so beautifully inlaid—those potteries of Bernard Palissy—those Persian majolicas, with metallic lustres, manufactured in Europe by the Arabs of Majorca, and of which Maestro Giorgio found out the secret—even the enamel sculptures of Lucca Della Robbia, are at the present moment the object of the researches of "céramistes." Some more or less able, but not having industrial art as their object, have got into a difficulty and remain there. Some, on the other hand, if they are able to reconcile our wants of luxury with the real laws of decorative art, have an unlimited field before them, and will be able to realise all those marvels of fairy tales in which are to be seen palaces of rubies, emeralds, and sapphires, built, as it were, by enchantment.

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The Exhibition of Industrial Art has revealed to us the causes which point to the inferiority of France. The evil is in the confusion of systems and methods which has reached its climax, but with the evil it is necessary now to indicate the remedy. This remedy will be found in the direction which it will be possible to give to the Industrial Schools of Art. Before, then, that young heads are perverted by the sight of objects which surround us, place them in the midst of that which is pure and real, and develop from nature their precocious love of the beautiful, they will then proceed in the right direction, knowing where they will be instructed; then the young artists in leavingthe schools, will not consider it necessary to try historical subjects, and a grand style to reach a high state of perfection; they will learn that with talent and taste it is possible, without pretending to too much, to arrive at fortune and reputation. Forced to restrain their too ambitious flight, they will devote to industry their talents and their knowledge. We appeal to the great masters of the art not to disdain industry, but to give it their support; not, as it were, to imagine that nothing is pure in art, but upon the condition of being materially useless, and that from the moment when they put their foot to the ground, their art, by that very fact, is looked upon with contempt.

We will remind them that Raphael drew arabesques on the walls of palaces, designs and tapestry work for vestments and hangings—that Titian, Tintoretto, Paul Veronese, and many others used to do the same, and knew that in giving a truly artistic character to divers industries, they augmented the influence, the riches, and the glories of their beloved country. It was in their studios that they taught and made choice of artists destined according to their particular inclinations—one for the manufacture of mosaics, and another for the celebrated glass ware, for the potteries of Murano, of Gubbio, of D'Urbino, the cloths that the merchants of the Rialto sold to the princes of the earth, the arms and the jewellery of Ponte Vecchio, and of Palazzo Reale. Having a love for art they did not allow themselves to have imposed on them, by illiterate dealers, forms and colours which our industrial artists accept and execute without blushing, because their position is not such as to enable them to guide rather than follow the taste of the age. We have in France vitality and strength which cannot fail us.

That period of the middle ages, which the intelligent commerce of the Italian Republics made to shine with such brilliancy, and when art was both elevated and healthy, because its promoters never forgot to take the useful as the starting point, should serve as an example. Let us apply ourselves to the work with courage, and by our legitimate anxiety at the sight of the progress of English industrial art may French Industrial Art be regenerated.

ELECTRIC FERTILISER.—Under this title the Abbé Moigno, in "*Les Mondes*," describes a process, by M. Bazin, for converting the nitrogen of the atmosphere into nitrate of ammonia, and using it for fertilising the soil. Water, in a state of extremely minute division, is caused to pass into a reservoir; a blowing machine forces into this artificial fog, as it may be called, a large quantity of air, which thus becomes saturated with moisture; sparks from an electro-magnetic machine are continually passed through this mixture of oxygen, hydrogen, and nitrogen, which cause the formation of nitric acid and ammonia and nitrate of ammonia. The water which is not decomposed dissolves the salt, and the reservoir in a short time contains a solution of nitrate of ammonia, of sufficient strength to be employed in the fertilisation of the soil. M. Bazin states that a litre of water thus treated will give one gramme of nitrate of ammonia. The chief expense is the fuel consumed in driving the magneto-electric machine, and the operation resolves itself into a transformation of coal into nitrate of ammonia. M. Bazin then proposes to use a machine, which he terms an "electric fertiliser," which is in the shape of a plough, the share of which, in the form of a knife, cuts the soil to the depth of about fifteen centimetres. The two poles of a small electro-magnetic machine, giving off a number of long sparks, are placed in communication with the soil. The apparatus is carried complete on a carriage, and is sufficiently light to be drawn by one horse. To it is affixed a cask for watering, with a cock for letting off the liquid placed close to the ploughshare, filled with the solution of nitrate of ammonia produced as above, or with any other liquid manure suitable for the soil or the crop intended to be grown. The description of this machine and its action is by no means clear, but such is all the information that is at present given. How far the production of the nitrate of ammonia by this process, and its use by means of the above machine is economical, M. Bazin does not give any data for calculating.

BOOTS AND SHOES BY MACHINERY.—A manufactory in which boots and shoes are made upon an extensive scale, by machinery, has been recently established in New York, and is thus described by the *Scientific American*:—"Three large apartments are occupied by the operatives, mechanism and goods. The skins for the uppers are first spread out, examined, and selected, according to the purpose for which they are required. Different cutters then cut out the respective parts, according to the size and form required, and these are all arranged and classified. After this these separate parts are given out in lots to be sewed by machines, and those uppers which are intended for boots are crimped, and the whole made ready for receiving the soles. The more heavy operations of punching, sewing, pegging the soles, and finishing the articles are next executed. The sole leather, in hides, is first steeped in a tank to soften it; then it is thoroughly dripped, and afterwards cut by a machine into measured lengths of a certain breadth, according to the size of the sole wanted. After having become sufficiently dry, these cut strips of leather are run between rollers, and also submitted to severe pressure under plates in a press, so as to effect as complete a compression of the fibres as is attained according to the old mode by beating with a hammer upon a lap-stone. From these compressed strips, soles of the different sizes are punched out at a single blow by a machine, the cutter of which is of the size and form required, and it turns round so as to cut a right and left sole alternately. Heel-pieces are also cut out by hollow punches at a single blow. The edges of the soles and heels are next smoothed

and polished in a small rotating machine; and another machine then makes the channels in the soles for the rows of stitching. After this the under soles and uppers are fitted upon lasts and made ready for sewing. The operation is executed by Mackay's peculiar machine adapted for this specific purpose. The waxed thread is wound upon a vertical spool, and is conducted through a guide situated upon the top of an elbow secured on a swivel joint capable of turning under the needle, and conducting the thread into the crease round the sole. The needle operates vertically above the sole, and the waxed thread is led into the interior of the boot or shoe by the guide, the needle descending through the sole, drawing through the thread and forming the stitches, which are pressed down close into the crease by a tracer-foot, upon which great pressure is exerted. In this manner the soles and uppers are united firmly and neatly together in a few seconds, without employing a welt. Hand-sewing cannot be compared with such machine work for accuracy and rapidity. Another machine is employed for putting on double soles with copper pegs. A thin strip of copper is fed in at one side and the holes are punched in the sole, the pegs cut and put into the holes, and then driven down by one continuous operation, with a speed corresponding to that of sewing the soles. The crossing of the half sole at the instep is pegged, and also fastened with a screw at each side by hand; the heels are also pegged down. The edges of the heels are neatly trimmed by a small rotating machine, and the soles are also rubbed down by a machine; so that nearly all the operations connected with the manufacture of boots and shoes in this establishment are performed by machines designed especially for the purpose. The legs of the boots are stretched and the wrinkles removed by new boot-trees secured to benches, and are expanded in an instant from the interior by pressing on a treadle with the foot. These boot-trees are altogether superior to the clumsy old wedge kind. The materials used in the manufacture of these articles appear to be of a superior quality, the machine not being adapted for operating on inferior patch leather. Another novel feature connected with these machines is that they are driven by one of Roper's hot-air engines; it has been running for several months, requiring but little attention, and consuming a very small quantity of fuel. The accurate operations of these machines, and the rapidity of their action, place them in a highly advantageous position for manufacturing boots and shoes. One hundred men will turn out with these machines as much work as four hundred men without them. About 500 pairs can be turned out daily in this establishment. Perhaps no labour connected with boot making is so severe as that bestowed upon burnishing the heel with a warm iron. This work is still executed by hand, but a machine is now being set up to accomplish this finishing operation, and it will soon be at work."

COTTON IN CYPRUS.—It is stated that the experiment made of the cultivation of cotton in this island has succeeded beyond all expectation, and the price of raw cotton has increased tenfold. What was worth only from eight to ten piastres now sells for seventy piastres. The crop of last year, which promised well, was totally destroyed by locusts, and it became necessary to sow the ground anew; but precautions are to be taken to prevent a repetition of the disaster. The Ottoman Government, with a view to encourage the cultivation of cotton in Cyprus, is selling land at the rate of from 20f. to 50f. the measure of two-and-a-half acres, giving at the same time great facility for the payment, exemption from taxes for many years, and liberty to import spinning machines free of duty.

CHEAP LANTERN POLARISCOPE.—Mr. Samuel Highley has recently introduced a polariscope that can be used in conjunction with the magic-lantern, without the instrument being sent to an optician "to be fitted" with such an adjunct, and at a moderate cost. The *Electrician* gives the following description of the instrument:—"The various parts are mounted on what the inventor calls 'a gout-board support;' the upright is fitted with an adjustable panel that carries a bundle of glass plates on one side and the stage and power on the other; this allows of the entire arrangement being accurately 'centred' with any lantern with which it may be employed; when adjusted, the panel is clamped by means of a milled-head screw. The 'bundle' consists of such a number of thin glass plates as will give a bright reflected beam of polarised light, and is attached to the panel at the proper angle for producing such a beam. The spring stage for carrying selenite designs, unannealed glasses, pressure and heating clamps, and the larger objects, is formed within a large tube attached to the front side of the panel; and to the front of this is screwed a spring jacket, within which slides the power and stage for the smaller crystals employed. To the front part of the base-board an adjustable rod is fixed that carries the analyser, which consists of a large prism, made expressly for the purpose of giving a large and pure field of colour, the absolute field attainable being of course dependent on the intensity of the source of light employed, as oil, oxy-calcium, oxy-hydrogen, or the electric. Provision is made for rotating both the smaller and larger objects, when necessary for the demonstration of certain phenomena. When selenite designs are shown on the screen, the crystal power is replaced with another of suitable construction. To use this polariscope, the nozzle is placed at right angles to the screen, and the base-board is then clamped to the table. The front lenses of the magic-lantern are removed, the condensers only being employed, and the source of light moved till a beam of parallel rays is produced; the lantern nozzle is then pointed at the bundle till the rays are incident at the polarising angle for glass, the proper direction being indicated for the uninitiated by a white line marked on the framework, the right adjustment of parts being further indicated by the appearance of an even disc of light upon the screen. A design is then inserted in the large stage, its lines of construction focussed, the analysing prism inserted in its jacket, and the coloured effect produced and varied, either by the rotation of the prism or the rotation of the design or crystal. By removing the panel from the support, and placing it before a window, with nozzle pointing upwards, and adding a suitable power, it may be then used as a table polariscope, or the light of a reading lamp may be employed as the source of light."

MULHOUSE SCHOOL FOR TEACHING THE THEORY AND PRACTICE OF MECHANICAL WEAVING.—At Mulhouse a school of the above character has been established, under the patronage of the "*Société Industrielle*" of that place. The object of the school is to supply that which the professional teaching of the district does not include, namely, the affording to young persons opportunities of studying the general theory of weaving, and its various applications to all kinds of fabrics. The approach of a more lively struggle with foreign industries has caused a greater need for this institution. The students leaving this school with good certificates, and well educated in other respects, it is confidently expected will render good service to any establishment with which they may afterwards become connected. Its organisation on a good foundation is due to the liberality of the merchants and manufacturers of the Department, who have come forward with funds. It is established on the footing of a manufactory, and forms a complete establishment of itself, with steam power and machinery, with workshops for repairs, &c. It contains power-looms for weaving with from one to six shuttles, of both French and English construction, on the different systems of the most recent and most perfect kind; there are also hand-looms, Jacquards, a complete series of preparatory machines, such as machines for reeling, warping, &c., besides all kinds of machines and models for the purpose of initiating the student in theoretical knowledge, to be followed by practical demonstration. The course of study is separated into two divisions, the one for theory and the other for practice. The two,

however, go on together, that is to say, the student passes regularly in succession from theory to practice. The first division comprehends specially the studying and analysing the various structures of the different kinds of fabrics, particular attention being given to fabrics which are specially adapted to the wants of the district. This course finishes with the making of drawings of the machines in the school, the study of the best arrangements for producing new styles of fabrics, the making plans and calculation of the cost price of the material and the manufactured article, book-keeping, &c. The practical course consists of actual hand-work—the mounting, arranging, adjusting, repairing, and keeping the machines in good order; the putting into practice those things which the pupils have learnt in theory, going through all the preparatory operations, each pupil being assisted by a skilled foreman. Besides, every day, there is a special course of two hours for journeymen desiring to learn the art of weaving. Each pupil is attended to separately, and never is allowed to pass on to anything fresh until he has a perfect knowledge of the preceding subject. The cost of admission to the theoretical and practical courses is fixed at 600fr. (£24) a year for each pupil. A pupil may enter for one course only. The admission fee for the theoretical course only is fixed at 300fr. (£12) a year, and the fee to the practical course at the same amount. The school year consists of eleven months. The fee for the special course of two hours is 25fr. (£1) a month, and is paid in advance. Paper, and all necessary materials and specimens, must be provided at the cost of the pupils. The annual payments are made half on entering and the balance three months afterwards. These fees remain the property of the school, whether the pupil remains the whole time or not. Foreigners, as well as natives, are admitted to the school. As each course is personal, a pupil may be admitted at any period of the year. He must produce on entering certificates of good conduct and ability from other institutions he may have been at. A certificate of skill is given to the pupil on his leaving, only when he has deserved it by assiduous attention to his work and irreproachable conduct. At the conclusion of his studies the pupil is compelled to pass an examination, the result of which is sent by writing to the director. This examination consists in answering questions relating to the theory and practice of weaving, as well as the preparatory processes which the candidate has studied during his stay in the school. The pupil must besides show himself capable of explaining and analysing all the specimens of fabrics which may be placed before him in connection with each of his theoretical courses. He must also submit a general plan of the school, with its prime mover, and shafting and drawings of the different machines; complete plans of the various methods of weaving; his note book of his courses of instruction and work, and the whole must be done with great care and neatness. The course commences and continues as follows: in the morning from eight o'clock to twelve, in the afternoon from two o'clock till six, with the exception of Saturdays, when the school closes at four o'clock. Pupils who do not arrive at the school within half an hour of the times fixed will not be admitted. For pupil workers the school is open at seven o'clock in the afternoon. The school is closed on Sundays, and on days of legal holiday. Everything tending to disturb the course of work, whether noise, singing, or talking, is prohibited, as well as smoking in the lecture-rooms, work-rooms; or the introduction of eatables or wine. No pupil can introduce persons to see the workshops without the permission of the director. No one is permitted to meddle with a loom except in the presence of the foreman, who must always be present, and must see when the work is over that everything is put into its place. This rule must be strictly adhered to, in order to prevent accidents to the machines, &c. On days for practical working all the pupils are obliged to be in the weaving workshops, and must do their utmost to produce good work, and make as little waste as possible. The steam-engine, the heating, and the oiling the machines, &c., is placed in charge of the pupils in turn, according to a fixed *rota*. They must take special care to prevent accidents, and, on the least derangement of the machines, must immediately report the same to the foreman. The holidays are fixed by the managing committee. Monthly reports of the conduct and work of each pupil are sent to the parent, in order that he may know what progress is made. The pupils must conform in every respect to the rules; every infraction of the rules, if repeated, every want of respect towards the director or foreman, frequent late attendances at work or absences without good reason, and any other grave fault, even out of school, are reported to the Managing Committee, who have power to expel any pupil so neglecting his duties. The manufacturers and merchants who want information on any special kind of work, or on the arrangement of any kind of work, have the privilege of applying, verbally or in writing, to the director for information; and the information given, accompanied, if required, with demonstrations at the school itself, are charged for according to the time taken up in the matter, or the difficulty of executing the fabrics, in respect of which explanation is required. An annual subscription, the conditions of which are supplied by the director, may be made in lieu of payment for such advice. In order to assist inventors in trying improvements, the school affords its co-operation to those interested, and receives machines and inventions, and will submit them to the *employés* in the shops. The school will undertake, if asked, to make known to the inventors the observations which such an examination has elicited.

NEW KIND OF SKATE.—Mr. H. Cholmondeley Pennell has forwarded to the Society's House a specimen of a skate, invented by him, with two blades, his principal object being to facilitate the acquirement of skating by young people and persons with weak ankles. In describing his invention, he says:—"The ordinary single-ironed skate imposes upon beginners very great, and, to ladies and persons of delicate frame, almost insuperable difficulties in the way of its use; difficulties which are, it would appear, by no means unavoidable, but to be attributed to the want of application of the ordinary principles of mechanics. Thus, in the common skate, the sole of the foot is raised unnecessarily high above the ice —about 1½ inch—the edge of the iron on which the body has ultimately to be balanced is extremely narrow, whilst the portion of it actually touching the ice at any one time is little more than half-an-inch; in the new skate, however, the sole is only raised from one-half to three-quarter of an inch, and the portion resting is 1½ inch. It may also be added that the old skate weighs more than half as much again as the new one—the weights being 14 and 9 oz. respectively—and that there is a considerable difference in the manufacturing cost in favour of the new skate, which is besides much more durable and far prettier on the foot. Another portion of the invention consists of a heel-peg, which is capable of application to ordinary skates. This has a point projecting below the iron, and capable of being raised and lowered at will, by means of a screw. Its object is to check or stop the skate the moment the body of the skater is thrown backwards in the act of falling; the peg is then driven more or less forcibly into the ice, and effectually prevents the skate slipping from underneath, and the consequent fall. Whilst the body is in the ordinary skating position, this peg can be arranged so as never, or hardly ever, to touch the ice; and when the skater is no longer in need of precautions, it can be readily screwed up away from the ice altogether." In conclusion, the inventor states that his main object in bringing forward this invention is to increase as much as possible the out-door amusements in which ladies can take part, which, in view of the present highly artificial constitution of society, is a point well worthy of consideration.

Commerce.

TRADE MARKS.—The Duke of Newcastle has forwarded to each of the governors of the British Colonies, to be laid before the Colonial Legislatures for action thereon, a memorial, addressed to him by about thirty of the principal manufacturers of goods, wares, and merchandise, using trade marks to distinguish and identify the articles manufactured by them. They complain that, in the course of their various dealings with many of the colonies, they are far less protected against the trade frauds and constant imitations and forgeries of their trade marks than in the United Kingdom itself, or in those foreign countries with which we have commercial treaties. The piracies complained of and the frauds alluded to are matters of daily occurrence, and carried on with the utmost openness and practically with perfect impunity, and they therefore ask that the law of the various colonies of the empire may be assimilated to the improved law of the mother country.

FOREIGN COMPETITION.—The Paris correspondent of the *Times* writes :—French trade is indeed far from being ruined by French competition. Manufacturers admit this, and the protectionists, who predicted ruin and desolation, are almost dumb. I have just heard of an American company in want of rails instructing its agents to give a large order to the manufacturer who should supply the best article at the lowest price. The agents tried some houses in England, and then in France, and finally gave the order to a long-established and well-known firm in the department of the Moselle, where they found what they wanted, at least as good, and certainly cheaper than in England. The head of the establishment is M. Wendel, one of the richest ironmasters, and until now one of the most ardent and, I dare say, sincere protectionists in France. He has beaten the English manufacturers in open competition.

TRADE IN FRANCE.—It appears from the official returns published of the imports and exports for the first 11 months of the year 1863 that trade in France improved during that period. The imports amount to 2,179,527,159f., showing an increase of 155,313,933f. over the corresponding period of the year 1862. The exports amount to 2,384,875,256f., being an increase of 371,083,360f. over the year 1862. If to these figures be added the value of the precious metals imported and exported, which are given separately in the official returns, but which are bought like any other merchandise, the imports will amount to 2,666,000,000f. for 1863, and to 2,498,000,000f. for 1862, and the exports to 2,939,000,000f. in 1863, and to 2,407,000,000f. in 1862. The Customs duties produced 159,000,000f. during the first 11 months of the year 1863, and only 138,000,000f. during the corresponding period of the year 1862. It was the sugar imported which produced this increase in the Customs receipts. The foreign and colonial sugar imported into France in the year 1861 produced each, in round numbers, 24,000,000f., and in 1863 each 43,000,000f. There is likewise an increase in the duty paid on fermented liquors imported. It amounted in 1863 to 186,000,000f., and in 1862 to 178,000,000f. Tobacco produced 205,000,000f. in 1863, and 200,000,000f. in 1862. The duty on salt has not recovered since it was reduced, and there is a loss on gunpowder. The stock of merchandise in the bonded stores on the 1st of December, 1863, was inferior to that of the corresponding period of the two previous years. The quantity expressed in metrical quintals was 2,455,000 in December, 1863, 3,019,000 in 1862, and 3,173,000 in 1861. It is particularly in the Havre and Marseilles stores that the merchandise has diminished. There were more French ships employed in the importation of merchandise in the year 1863 than in former years, and still more in the export trade. There were likewise more ships employed in the import trade, but fewer in the export of merchandise. The tonnage inwards amounted to 4,193,550 tons, and outwards to only 2,940,592 tons. This is explained by the fact of the imports consisting of the raw material employed in the manufactories, and of coal, which weigh heavier than the manufactured goods exported.

Colonies.

SUGAR CULTIVATION IN QUEENSLAND.—The most extensive sugar plantation in this colony is on the estate of the Honourable Louis Hope, at Cleveland, and occupies one of the most pleasant situations in Moreton Bay. It consists of an elevated tract of land; the soil is, for the most part, of a friable loam, reddish brown on the surface, and deep red below; it is almost entirely free from stone, which is found only in the form of irregular pebbles of nearly the same colour as the soil, and apparently of ferruginous texture. Amongst Captain Hope's earliest experiments in cultivation was the planting of a small nursery of sugar cane, which, by successive propagations, and the introduction of fresh cuttings from other sources, he continued to enlarge for two or three years. Great difficulty was experienced for some time in getting a sufficient supply of canes to engage in the cultivation of sugar on a large scale, but it has at last been surmounted. At present there is an area of about twenty acres cropped with canes; about thirty acres more have been cleared, and it is expected that by this time next year the plantation will extend to between 60 and 70 acres. The ground has been prepared by ploughing and cross-ploughing; it is found advantageous to return the plough along the furrow so as to throw up the soil in ridges, with trenches for the storm water to run off clear of the roots of the canes. Holes are then hoed in the ground about a foot deep for the reception of the cuttings, which are about nine inches long, and contain from two to four "eyes," one of which appears on every joint of the cane. In ten days or a fortnight the sprouts show up, and as the young plants grow, the holes are gradually filled up with earth. The period required for the cane to arrive at maturity is uncertain, and depends materially upon the time of planting. Captain Hope has planted canes every month in the year, and his experience will no doubt shortly show which proves the most advantageous. When ripe the canes take no hurt by remaining in the ground, and they are only cut as required for the mill, it being desirable they should be ground as fresh as possible. The purple cane is the more hardy, but the yellow cane yields the best sugar. The canes must be cut as close to the ground as possible, in order to secure the greatest quantity of sugar, the richest juice being in the lowest joints. From experiments made by Captain Hope, the test of the saccharometer gives the juice richer qualities than are found in the average West Indian canes. Twenty-four canes yielded seven gallons of juice, from which was produced a splendid sample of sugar that was exhibited in Brisbane some time ago. The quantity of sugar made for exportation is but small. A mill for the manufacture of sugar is in course of erection; the plant, steam-engine, &c., are daily expected from England. The capacity of the machinery is estimated as equal to the requirements of a plantation of a thousand acres, being capable of crushing six tons of cane, the produce of three acres of ground, in 24 hours. The buildings at present on the estate consist of a kiln for burning lime to clarify the sugar, workmen's huts, overseers and storekeepers' houses, stores, &c. The Honourable Mr. Bigge is about to commence sugar growing; he is now clearing fourteen acres of the red soil, which will be planted with canes in a few months.

QUEENSLAND BOTANICAL GARDENS.—Repeated and successful experiments have been made here in growing the sugar-cane, the coffee plant, tea plant, tobacco, ginger, *Chinchona calisaya* (quinine-yielding plant of South America), cotton, the Paraguay tea tree, spices of all descriptions, and many other useful plants. The results show that the cultivation of the sugar-cane is likely to

prove very profitable. The experiment with the coffee plant has also been successful—the plant is at present in full bearing, and the berry is fine and full-flavoured; it is expected to yield from seven to nine pounds, whilst in Ceylon two pounds and a half from one plant is reckoned a fair average yield. A small plantation has been laid out, which gives every promise of success, so that it is plainly demonstrated that coffee can be profitably grown in Queensland. There are two plantations of *Thea Bohea*, consisting of several hundred plants, which are thriving well. The *Chinchona calisaya* was introduced in the early part of last year, and from the fact that it is being rapidly introduced into the tropical colonies its growth was looked forward to with much interest, and the plant takes kindly to the soil, and is in a flourishing state. The tobacco plant is also a success.

SLUGS IN AUSTRALIA.—A northern stockholder states that millions of slugs have been seen moving south-west in a body, and stripping the country as they go. They had cleared about one and a half mile long and from a half to three-quarters wide. The grasshopper birds have also returned, who, in the absence of grasshoppers, of which none have been noticed, may possibly take to the slugs and destroy them.

Obituary.

Dr. JOSEPH BATEMAN, barrister-at-law, who died on the 10th November, was born on the 4th March, 1797, at Selby, in Yorkshire, where also he was educated, and in 1811 was articled to Mr. Edward Parker, solicitor, of that place. He remained with that gentleman until 1821, when he came to London to fill a situation in the office of Messrs. Carr, Solicitors to the Board of Excise, having previously entered himself at Lincoln's-inn on the 23rd April, 1819. In the year 1829 the relationship of Messrs. Carr to the Board of Excise ceased, a solicitor's department being established, on which occasion many of Messrs. Carr's clerks were incorporated with the revenue service, and from that date Dr. Bateman became a Government officer, eventually rising to the head clerkship, though by the ordinary rule of the service he was not eligible for further promotion. His character and talents, however, stood so high in the estimation of the Government, that when the office of Assistant-Solicitor to the Excise became vacant in 1846, the late Sir Robert Peel selected the deceased for the position, conveying the announcement of his appointment in the following very gratifying terms:—

Whitehall, July 4, 1846.

Sir Robert Peel presents his compliments to Mr. Bateman. He is very glad to have the opportunity of rewarding the long and faithful services of Mr. Bateman by a promotion, not in the ordinary course, but well deserved by him.

He was called to the bar on the 27th January, 1847. On the amalgamation of the Stamps and Taxes with the Excise, and their junction at Somerset-house, he retired from office, and found congenial occupation in his retirement in the exercise of his functions as a magistrate of the county of Middlesex. From his earliest years Dr. Bateman had employed his leisure in the pursuit of literature. One of his earliest publications was "The Highway Acts," which has gone through several editions. The standard work, "The Law of Auctions," was his next book. He also published "The General Laws of Excise," "The Excise Officer's Manual," and the large and important volume, "Bateman's Excise Laws," quoted as the authority in the courts of law. He early associated himself with Dr. Birkbeck and others, in the establishment of literary and scientific institutions, and by his own lectures and personal and pecuniary assistance, greatly aided in securing the prosperity of more than one of such associations. He became a member of the Society of Arts in 1840, and for several years took an active part in its proceedings, and assisted on one of the committees of the Exhibition of 1851. The deceased was much interested in the British Association for the Advancement of Science, and contributed several papers to its transactions. As a tribute to his scientific and literary acquirements and works, the University of Giessen conferred upon him the distinction of Doctor of Laws.

Publications Issued.

THE BROWN BOOK. (*Saunders, Otley, and Co.*) This is intended as a book of ready reference to the hotels, lodging and boarding-houses; breakfast and dining-rooms; libraries, public and circulating; amusements; hospitals, schools, and charitable institutions of London; with full information as to situation, specialty, &c. It contains a "handy list," showing the nearest post-office, money-order office, cab-stand, police-station, fire-engine, fire-escape, hospital, &c., to one thousand of the principal streets of the Metropolis. It also includes a notice of the literary and scientific societies, with lists of their meetings for the present session; particulars and (in some instances) plans of the theatres and other places of amusement, and an account of the various sights of the Metropolis. It is intended to publish an edition half-yearly.

Notes.

MEDICATED WINES AND THE EXCISE.—From a correspondence which has lately taken place between the Inland Revenue Board and the President of the Pharmaceutical Society, with reference to the necessity of a "wine license" for the sale of "medicated wines," such as "orange quinine wine," "aloes wine," "colchicum wine," &c., it appears that whenever articles are held out by label or advertisement as beneficial to persons suffering from any ailment affecting the human body, they can only be sold under a patent medicine license, and with a stamped label on each packet, and also in strictness under an Excise wine license (Foreign or British), according to the character of the wine. The Board, however, state that, except in cases where there may be reason to believe that a beverage is being sold under colour of a medicine, they will not interfere with the sale, without any Excise license, of medicated wines of the character indicated, provided such medicines do not fall under the category of patent medicines.

NEW MOTIVE POWER.—A machine has heen exhibited at the Crystal Palace, by which it is hoped to introduce a new principle into locomotion. The invention is due to M. Casimir Noel, of Meaux, in France. This gentleman came to the conclusion that weight might be converted into motive power in the propelling of vehicles. The principle is not new, being already to some extent developed in the velocipede, and in the well-known action of the lathe in machinery. A car has been constructed which will move either with or without rails to go upon, and in which the weight of the bodies placed on it is so adjusted that with a very slight initiating power—whether human muscles, or horses, or steam—locomotion is stated to be effected with a great saving of force. The axles of the car are made with cranks, moved by elongated spiral springs; and the whole, with several persons on it, may be set going by one man, working his feet on a moveable part of the machine. The axles, instead of being connected with the naves of the wheels, bear on the main spokes of each wheel, and the weight falling on the spoke continues the motion which the operator has commenced. It is said that one man can wheel four hundred weight of stone on a barrow constructed on this principle, though the same weight on a common barrow is far beyond any ordinary man's strength. It is stated that M. de Lesseps has already ordered some of these barrows for the Suez Canal, but further information is necessary before any

definite conclusion can be arrived at as to the value of the invention.

THE CHARING-CROSS RAILWAY.—This line was opened on Monday, the 11th inst., not being, however, yet completed to Cannon-street. The line, though scarcely two miles long from end to end, has been nearly four years in construction. It runs entirely on bridges or arches, there being no less than 17 bridges and 190 arches, of which latter 18 are taken over streets and three over courts. Of the 17 bridges one crosses the Thames, the others cross great main thoroughfares. Those over the streets are among the longest single street spans ever built. The quantity of wrought-iron in the Charing-cross-bridge is 5,000 tons, and of cast-iron 2,000 tons. The bridges over the streets contain 3,250 tons of wrought-iron and 250 tons of cast-iron; 151,000 yards of brickwork with 41,000 yards of concrete were required to complete the arches, and 90,000 cubic yards of earthwork have been made.

PETROLEUM IN RUSSIA.—It is stated that a district has been discovered in Russia of similar formation to that of the oil-producing regions of Pennsylvania and other parts of America, and that an American has obtained a concession from the Russian government of a tract of 50,000 acres.

SOUTH KENSINGTON MUSEUM.—The following advertisement appeared in the *Times* of the 5th instant:—"To Architects:—The Commissioners of her Majesty's Works and Public Buildings give notice that they are prepared to receive designs from architects for two new museums, to be erected on part of the land, at South Kensington, recently purchased by the government, and used in 1862 for the International Exhibition. Plans of the grounds, together with a statement of the premiums and other particulars will be forwarded to architects on application, by letter, addressed to the Secretary of her Majesty's office of Works, 12, Whitehall-place, London.—January, 1864."

BRITISH MUSEUM.—The time-honoured custom of maintaining a military guard at the British Museum was discontinued at the close of last year, when the sentinels on duty at the principal entrance were permanently displaced, and the sentry boxes removed. The charge of the national collections has devolved upon the Metropolitan Police, some of whom are constantly stationed within the building. This arrangement extends to the National Gallery and other public institutions.

Correspondence.

THE ALLEGED EARLY PHOTOGRAPHS.

SIR,—For some months past the world of Photographers in London has been in a high state of excitement owing to the discovery, among the papers of the late Matthew Boulton, of a series of coloured prints which are supposed to have been produced by some process now unknown, and at the same time two early specimens of pictures on silvered plates were produced from a drawer at the Soho works. Mr. Smith, of the Museum of Patents, who met with these specimens, in relating the history of the pictures which he supposed to be photographs, stated to the members of the London Photographic Society, at its meeting in November last, that

"Although a long time had elapsed since the matter had come into his hands, and he had expended much time on the subject, he was still far from having secured as full and satisfactory details as he could have desired. About twelve months ago he visited the Soho Works at Birmingham, on business connected with obtaining Watt's first engine for exhibition at the Museum of Patents, when, by the kindness of Mr. Price, a gentleman who was agent for the Boulton family (an office which he and his family had held for two or three generations), he saw various matters connected with their inventions. Mr. Price showed him two of the pictures now on the table. Seeing him interested in the matter, Mr. Price then brought out of a drawer the two pictures on silvered plates (he would not call them daguerreotypes). He thought the matter over, and it struck him, from what he had seen and heard, that they must be something important. He wrote to Mr. Price about them, who told him all he knew of their history. He then asked him for them, that they might be preserved in the Patent Museum. Mr. Price sent them up, and he commenced his further investigation. His own opinion was, that the paper pictures were the production of the camera-obscura, that the image was thrown on to paper prepared with some chemical substance, which retained the image, and that it could then be transferred, as some of the documents he had obtained stated, to other surfaces, such as copper, iron, &c. The pictures were produced on paper such as was not made now, but had been made about 100 years ago. It had no date, but bore the name of Whatman. The present owners of the mills where it was made, Hollingsworth and Co., had since then added a date to the paper; but they informed him that the name only used to be employed, and that the paper was probably 100 years old. It was the strong, coarse, wire-marked paper. One of the first points which struck him was, the figures in one of the pictures ("Venus and the Graces," by Angelica Kauffman) seemed left-handed; and shortly afterwards he was able to procure an engraving of the same subject by Bartolozzi, which was drawn just the reverse. He then found that the figures in all the paper pictures seemed to be left-handed. In the large picture by West, for instance, they would perceive that the physician was using his left hand to feel the pulse. These paper pictures, he found, were produced by a method invented by Mr. Francis Eginton, about the year 1773. He was taken by the hand by Mr. Boulton, who appeared to have undertaken the production of the pictures from any painting, and securing copies on paper, copper, canvas, &c. This transfer appeared to have been on what was termed, in the documents he had found, "dead colour." When thus produced, they were frequently finished as oil-paintings, water-colour drawings, &c., and passed into the hands of Mr. Barney to colour. A large number of them appeared to have been done, the subjects including the choice works of the best artists of the day. The paper pictures appeared to be an invention distinct from the pictures on the silver plate. Eginton's process appeared to flourish in 1780; but nothing more was heard of the matter after. The silver-plate pictures appeared to have been produced about the year 1791. Then there were, next, two pictures by Thomas Wedgwood, which, by the kindness of Miss Meteyard, he was able to show them; they appeared to have been taken about the year 1791. Josiah Wedgwood was a member of the Lunar Society, with whom it was probable the invention originated; and it was very probable that he would tell his son Thomas what had been done; so that he might have derived his ideas on the subject from this source. He would, however, without further remark or hypothesis, read the various documents from which the history had to be deduced. They were sorted from a mass of papers taken out of Mr. Boulton's private library seventeen or twenty years ago, and at that time the library had not been opened for about fifty years."

Mr. Smith, having so stated his case, proceeded to read extracts from a number of letters and other documents which had been selected from a mass of correspondence found at the Soho Works, and which he considered tended to prove the hypothesis that the pictures in his possession were produced by chemical or photographic agency at a date prior to 1791.

With reference to the silver pictures, I would merely state that the evidence produced in support of the date of their supposed production does not in any way justify the assumption that the dagurreotype art was either known or practiced at Soho in 1791. At the same time it is generally admitted that the plates in the possession of Mr. Smith are early specimens of the daguerreotype art. My present object is rather to endeavour to point out what I believe to be a fallacy in attributing the production of the paper prints to photographic agencies.

It will be seen from Mr. Smith's statement that the prints were produced by a method invented by "Mr. Francis Eginton about the year 1790, that he was taken by the hand by Mr. Boulton, who appeared to have undertaken the production of copies from any painting, and securing copies on paper, copper, canvas, &c." The copies were made in what had been called "dead colours," and in some cases two or more colours were employed. When thus produced "they were frequently finished as oil paintings, water-colour drawings, and passed into the hands of Mr. Barney to colour."

The sepia tone of some of the prints corresponds with the tint of a large number of the photographs now produced, while the extreme delicacy of the surface from which the impression was taken has led to a belief that they could only be the result of chemical agents acted upon by light. This opinion is also based upon the fact that the impressions were taken on paper, the surface of which had been specially prepared, and after the lapse of nearly a century the prepared surface can be removed by friction, and the entire impression obliterated, the image not having been absorbed into the body of the paper, the paper itself being a hard and not a soft printing paper. Mr. Eginton secured copies on paper, copper, canvas, &c., and they were frequently finished as oil paintings, water-colour drawings, &c. All this appears to me to be quite intelligible to the eye and mind of any practised engraver and printer; and the prints themselves seem to interpret the mode of their production. In the first place I would say that the paper on which the impression is taken bears unmistakable evidence of the use of a metal plate, a well-defined line having been impressed on the paper by the edges of the plate in its passage through the printing-press. This is quite consistent with the production of copies of pictures on copper, iron, &c. With reference to the next point, the method by which the minutely granulated surface was obtained, I believe that any skilful acquatint engraver could reproduce a similar surface at any moment, if it were desired, by simply laying the ground of his plate by means of a delicate solution of any of the gums or resins used by acquatint engravers, the gradations from light to shadow in the pictures being dependent upon the action of acid in biting in upon the surface of the plate so prepared. That the effect obtained was due to an acid action is to me evident from the flatness of the parts of the picture which have been stopped out. This is especially apparent in the foliage in some of the impressions. Next as to the materials upon which the print was produced, paper, canvas, &c., the copies being frequently finished as oil paintings or water-colour drawings. The prints in the possession of Mr. Smith are upon a hard paper, the surface of which has been prepared, some of the impressions being in two or more colours. It was a common practice during the latter part of the last century to print from mezzotinto, acquatint, and chalk-engraved plates in several colours, and I think that anyone who will carefully examine the Soho impressions, will detect ample evidence of a compound process of printing with coloured inks. These inks were applied to the plate according to a process given by Mr. Robert Laurie in 1776, and published in the second volume of the Society of Arts' Transactions, where he says:—

"As the ingenious and laborious works of many eminent men have been ushered into the world with inelegant and inexpressive cuts, principally owing to the great expense attending the execution of good engravings, I have been induced to attempt a method of engraving and printing in colours, which has answered my most sanguine expectations, both with respect to the ease and expedition with which they are executed, and consequently the little expense at which they may be afforded. In this manner, animals, plants, &c., for illustrating natural history, may be finished in their proper colours, very much like drawings, and greatly resembling nature. The plates will also admit of being repaired, so as to furnish a large impression. If this, my first attempt, should meet your approbation, it will encourage me, under your inspection, to proceed on a more extensive plan. The bird represented by the prints now laid before you, is taken from one which Captain Cook brought from between the tropics, caught in his last voyage round the world, and I beg leave to submit the plate, from which the impressions were taken, to the consideration of the Society. Mr. Laurie's explanation of the method of taking coloured prints from mezzotinto plates is as follows:—A copper plate with an etched or engraved outline, dotted next the lights, and filled in with mezzotinto ground, is printed in colours, after nature, or from a picture, by the following process. The plate being warmed in the usual manner, the colours are applied, by means of stump camel hair pencils, to the different parts, as the subject suggests; it is then wiped with a coarse gauze canvas, any other being improper; after this it is wiped clean with the hand as in common practice, and being again warmed, is passed through the press. The colours are mixed with burnt linseed oil, and those generally used by painters are proper.—ROBERT LAURIE, aged 20, Nov. 1776."

This process of compound printing is now continued in a modified form, small dabbers being used for the broader surfaces in place of the stump pencils.

If the impression was to be finished as a water-colour drawing, it would be necessary to use a hard paper or to prepare the surface by coating it with isinglass, gum, albumen, sugar, or any of the ordinary common and well-known mediums. If a water-colour was to be copied, albumen or gelatine would probably be the material with which it would be prepared, a water-colour being used in printing from the plate; the two would then combine, but the colour would not be absorbed into the paper; if the coating of gelatine was thick, it would in a century be likely to perish, and there would be no difficulty in rubbing off the impression from the paper. If an oil picture was to be imitated, gelatine would not be used, as the two would not combine. If canvas was used to print upon, no doubt oil colours would be employed. In the case of water-colours it was necessary to harden the surface of the paper, in order to prevent the colours applied by hand from running or spreading. I have thus endeavoured to show how paper, copper, and canvas, and their employment, are quite consistent, and how at the same time the surface of the metal plate could be obtained from which to print in either oil or water colours. In conclusion, I would venture to assert, that if it were desired on the ground of economy to reproduce any of the specimens exhibited by Mr. Smith, there would be no difficulty in finding the engraver and printer in the present day who would be ready to undertake the work.—H. G. H.

TRADE MARKS.—SIR,—As a leading article in to-day's *Telegraph* advocates the adoption of letters and numerals as trade marks, and as a letter from Mr. Chubb, suggesting the use of numerals as trade marks, appeared in a recent number of the *Standard*, perhaps you will kindly permit me to mention that a proposal, recommending the employment of combined letters and numerals for trade marks, emanated from me, in a letter entering fully into the subject, which appeared in your *Journal* as far back as March, 1862.*—I am, &c., M. HENRY.

Fleet-street, 7th Jan., 1864.

MEETINGS FOR THE ENSUING WEEK.

MON. ...British Architects, 7.
Medical, 8½. Mr. Spencer Watson, "On Inflammation of the Cornea, and the Influence of Morbid Secretions on the Mucous Surfaces of the Eye."
Asiatic, 3.

TUES. ...Civil Engineers, 8. Discussion on Mr. Heppel's paper, "On the Closing of Reclamation Banks." And, time permitting, Mr. J. B. Redman, "The East Coast between the Thames and the Wash Estuaries."
Statistical, 8. Professor Hind, "On the Commercial Progress and Resources of Central British North America."
Anthropological, 8.
Royal Inst., 3. Prof. Tyndall, "On Experimental Optics."

WED. ...Meteorological, 7.
Society of Arts, 8. Dr. A. Voelcker, "On the Injurious Effects of Smoke on Building Stones and on Vegetation."
Geological, 8.
London Inst. 7.
R. Society of Literature, 4¼.

THUR. ...Royal, 8½.
Antiquaries, 8.
Chemical, 8. 1. Mr. W. M. Watts, "Absorption of Mixed Gases in Water." 2. Dr. Thudichum, "On Uro-chrome."
Linnæan, 8. 1. Dr. Baird, "On a new *Annelid* from the Island of Ascension." 2. Dr. E. P. Wright, "On a new species of *Xylotria*, inhabiting Fresh Water." 3. Mr. Holiday, "On *Dicellura*, a new genus of *Thysanura*."
Numismatic, 7.
R. Society Club, 6.
Royal Inst., 3. Prof. Tyndall, "On Experimental Optics."

FRI. .....Royal Inst., 8. Mr. W. R. Grove, Q.C., "On Boiling Water."

SAT. ...R. Botanic, 3½.
Royal Inst., 3. Mr. J. Lubbock, "On the Antiquity of Man."

* Vol. X., p. 255.

Patents.

From Commissioners of Patents Journal, January 8th.

GRANTS OF PROVISIONAL PROTECTION.

Æriform and other fluids, apparatus for regulating the passage of—3096—M. Henry.
Agricultural machinery—2948—J. Platt.
Apparatus for controlling the passage of fluids—3226—M. Henry.
Apparatus applicable to time, fare, distance, and other tables, almanacs, &c.—2882—T. C. Kimpton.
Blinds, Venetian, painting—3172—J. M. Bryden.
Boilers, feeding—3220—E. Wilson and G. Lindsley.
Boots and shoes—3150—C. Stewart.
Boots and shoes—3068—J. H. Simpson.
Bracelets of papier mache, &c.—3269—T. W. Davenport and S. Cole.
Brewing—3032—R. L. Clifton.
Bricks, &c., preparation of clay for the manufacture of—3145—J. Platt and W. Richardson.
Brooches, fastenings for—3106—T. Perks.
Cases for packing bottles—3184—G. H. Ellis.
Cash taking apparatus for checking—3064—J. F. Hallet and T. L. White.
Casks, machinery for manufacturing—3166—J. Davidson.
Chromate of potash, &c., manufacture of—3160—W. Thornthwaite.
Cleaning roadways—3188—J. H. Johnson.
Coal, &c., machinery for cutting and boring—W. and S. Firth and J. Sturgeon.
Cottages or houses, portable—3196—R. Saunders.
Cotton, cleaning—3056—J. Conlong.
Cotton gins—3230—A. V. Newton.
Cotton gins—3283—T. Bourne.
Cotton, pressing into bales—3170—C. J. Robinson.
Crinolines—3070—R. A. Brooman.
Cutlery handles—3257—H. Barber.
Distillation of bituminous substances—3037—R. A. Brooman.
Driving bands and pulleys—3098—E. N. Gregory.
Engines for hauling agricultural implements—3126—T. Webb.
Fibres, softening and separating—3287—W. Whitaker and W. Tongue.
Fire-arms—3108—N. Kennedy, jun.
Fire-arms, breech-loading—3072—R. Richards and S. C. Willetts.
Fire arms, breech-loading—3275—E. Lindner.
Floor cloths—3210—F. Walton.
Fluids, drawing off and measuring—3263—H. P. Forrest.
Food for cattle—3174—J. Sellars.
Fuses, &c.—3080—G. C. Grimes.
Gas generators—3136—T. Clayton.
Gas, increasing the illuminating power of—3289—N. F. Taylor.
Gas stoves for heating, &c.—3042—D. Hulett.
Glass, manufacture of—3154—E. Rascol.
Grass cutting machines—3092—J. E. Boyd.
Guns, hydraulic presses, &c., strengthening—3164—L. Nobel.
Harrows, cultivators, &c.—3050—J. Green.
Hats and bonnets, ornamenting—2804—A. C. Durst-Wild.
Heating and ventilating horticultural buildings—3094—P. R. Wason.
Holder for cotton reels—3224—R. Mason and E. J. Green.
Horse, mechanical wooden—3163—V. Obert.
Hot-water and hot-air stove—3048—J. Corbett.
Houses, &c., of plastic materials—3228—M. Henry.
Hydraulic pressure gauges—3060—S. Smyth.
India rubber and gutta percha compounds—3116—G. T. Bousfield.
Iron or steel walls, shot proof—3202—R. Legg.
Kilns, malt and hop—3124—A. Epps.
Kilns for calcining ironstone—3273—J. Gjers.
Lamps for burning hydro-carbons—3130—J. Cliff.
Lamps, apparatus to be applied to—3146—W. T. W. Jones.
Letter boxes—3197—H. A. Bonneville.
Liquids, racking and decanting—3206—W. E. Gedge.
Locomotive engines and trains, &c.—3195—W. B. Adams.
Locomotives, reversing the motion of—3104—W. Macklin.
Looms—3058—G. Wilson.
Looms—3090—R. Harrowby, J. Foulds, and A. Harrowby.
Looms—3120—J. Bullough.
Looms—3291—D. Naylor.
Lubricating the cylinders of steam engines, apparatus for—3218—R. H. Taylor.
Machinery for grinding farm produce, &c.—3297—J. Patterson.
Mines, supplying air to lights in, &c.—3265—W. H. Bowditch.
Motive power, apparatus for obtaining—3277—E. Bramall.
Nails and rivets, machinery for making—3118—E. Darwen and J. Haddon.
Nuts, manufacture of—3132—R. A. Brooman.
Oil cans—3215—W. J. Dixon.
Oils, obtaining purified, and obtaining oil cakes from cotton seed, &c.—3114—J. A. Pols and P. O. Bernard.
Ordnance and projectiles—3192—P. Gardner.
Ordnance and projectiles—3194—P. M. Parsons.
Oxygen gas, obtaining—3046—J. Robbins.
Paper, manufacture of—3169—A. Starck.
Paper collars—3261—S. S. Gray.
Paper pulp, &c., utilising the waste liquors resulting from the preparation of—3168—H. Chadwick and J. Clench.
Pearl grinding, &c.—3157—S. Edwards.
Presses for bending metal plates—3110—W. and J. Galloway.
Printing machinery—3039—W. E. Newton.
Printing machines, cylinder—3134—E. and W. Ullmer.
Pumps, rotary—3180—E. Myers and H. D. Cloag.
Punching apparatus, hudraulic—3176—E. R. Hollands.
Railway accidents, prevention of—3243—M. M. Twining.
Railway engines, carriages, &c.—3182—J. B. Fell.
Railway signals—3178—R. A. Brooman.
Railways, permanent way of—3122—C. Seaton.
Railways, permanent way—3267—R. A. Brooman.
Receptacles for containing biscuits—3075—T. Bate.
Rollers for calico printing—3040—T. Knowles.
Rolling roads, apparatus for—3216—W. Clarke and W. F. Batho.
Ropes—3190—W. Clarke.
Sacks, &c., without seam—2937—A. Simoneton.
Screw propellers—3100—W. L. and T. Winans.
Sewing machines—3211—C. T. Judkins.
Sewing machines—3271—J. V. Boesiger.
Ships' cooking and distilling apparatus—3156—R. A. Brooman.
Ships and floating batteries—3293—W. M. Peniston.
Signals for ships and railways—3208—F. N. Gisborne.
Soda and sulphuric acid manufacture—3044—J. Bowron and G. Robinson.
Spindles, &c., for spinning—3084—J. Wray.
Stamp for marking letters—3086—M. Guthrie.
Steam boilers, incrustation of—3076—W. C. Page.
Steam boilers, composition for covering—3082—H. B. James.
Steam boilers, apparatus indicating the level of water in—3186—W. Clark.
Steam engines and boilers—3212—J. Howden.
Steam engines—3140—R. A. Brooman.
Stringed instruments, arrangements for facilitating the teaching and playing of—2729—R. Brooks and C. Inwards.
Sunken vessels, raising—3142—J. H. Johnson.
Superphosphate of lime, manufacture of—3152—J. Wright.
Taps—3200—J. Macarthy.
Thrashing and screening grain—3052—R. Hornsby, jun.
Tow, &c., treatment of—3112—M. Friedlander.
Treating brine from salted flesh—3295—A. Whitelaw.
War rocket—3102—T. H. Fletcher and R. Forrest.
Washing textile fabrics—3062—J. H. Johnson.
Washing, wringing, and mangling machines—3128—N. Walton.
Window shutter—3193—T. Hyatt.
Wool combing—3074—E. Clifton.
Wool combing—3158—B. Fothergill.
Woven fabrics, apparatus for producing a superior finish upon—3173—J. M. Worrall.

INVENTION WITH COMPLETE SPECIFICATION FILED.

Paper, manufacture of—7—C. Martin.

PATENTS SEALED.

1683. W. S. Bruce.
1687. W. E. Gedge.
1688. W. E. Gedge.
1689. S. Robinson.
1698. T. Preece.
1699. A. G. Southby.
1704. J. Thomas.
1706. J. Smith and S. A. Chease.
1709. R. A. Brooman.
1714. R. Agate.
1718. W. Tasker, jun.
1728. W. Henderson.
1731. R. and W. Hawthorn.
1736. J. Orr, J. Brinton, and J. Lewis.
1738. R. A. Brooman.
1740. J. Mortimer.
1749. R. A. Brooman.
1750. R. A. Brooman.
1763. E. Sonstadt.
1767. E. Funnell.
1770. W. T. Cheetham.
1771. W. Clark.
1796. F. Lepoutre.
1818. R. Weare.
1842. L. L. J. Fillion.
1872. A. A. A. Baron de Rostaing.
1895. J. P. Culverwell.
1914. B. W. Garland.
2389. W. Clark.
2394. W. Clark.
2678. J. Rawlings.
2781. H. Mege.
2818. E. Rowland.

From Commissioners of Patents Journal, January 12th.

PATENTS SEALED.

1760. J. Davison.
1766. J. Slater.
1768. T. Wimpenny.
1772. P. A. J. Dujardin.
1774. R. A. Brooman.
1777. D. Tamet.
1781. J.N. Tayler and W. Austin.
1784. L. R. Bodmer.
1785. C. Stokes.
1786. G. Rand.
1787. J. Lamb and S. Tovey.
1797. T. Johnson.
1801. R. Coenen.
1803. A. Clark.
1806. G. Murdoch.
1825. E. T. Bainbridge.
1828. R. A. Brooman.
1833. J. Ronald.
1839. J. Simmons.
1854. B. Birnbaum.
1915. J. Imbert, P. Bonnet, and J. Pfister.
1925. W. E. Newton.
1934. A. V. Newton.
1996. W. Clark.
2006. H. Brown.
2092. A. Jobson.
2093. L. Guillemot.
2151. A. V. Newton.
2300. H. C. Huskinson.
2441. S. Mathews.
2671. G. E. Donisthorpe.
2744. H. Bessemer.
2749. F. E. Tickels.
2766. T. C. Barraclough.
2834. J. W. Drummond.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

82. A. R. M. Normandy.
58. C. N. Leroy.
52. D. Adamson.
62. S. Moulton.
89. G. Whight.
88. W. Bullough.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

72. J. J. Russell & J. B. Howell.
214. P. H. Sharkey.